Table 1
Key functions that occur in unaltered watersheds and the major stressors affecting these functions. Data sources that can be used to evaluate the stressors are included parenthetically (see key at bottom of table). Within each function highly correlated stressors (correlation coefficients $r > 0.7$) were eliminated. Table adapted from Flotemersch et al. (2016).

Key function	Description	Major stressors	
		Within channel	**Outside channel**
Hydrologic regulation (HYD)	Maintenance of the natural timing, pattern, supply, and storage of water that flows through the watershed	• Presence and volumes of reservoirs (NABD) • Stream channelization and levee construction (NA)	• Percent of the watershed comprising agricultural land use (NLCD) • Total length and density of canals/ditches (NHD) • Percent imperviousness of human-related landscapes (NLCD) • Alteration to and spatial arrangement of riparian vegetation (LANDFIRE) • Boundaries, depths, and flows of aquifers (NA) • Groundwater use (NA)[*]
Regulation of water chemistry (CHEM)	Maintenance of the natural timing, supply, and storage of the major chemical constituents of freshwaters: nutrients (nitrogen & phosphorus), salinity or conductivity, total dissolved solids, hydrogen ions (pH), and naturally occurring minor constituents (e.g., heavy metals). Human-related alterations can include deviations from naturally occurring concentrations of these constituents or the inclusion of non-naturally occurring constituents, such as pesticides and industrial chemicals.	• Presence and volumes of reservoirs (NABD) • Stream channelization and levee construction (NA)	• Atmospheric deposition of anthropogenic sources of nitrogen and acid rain (NADP) • Percent of watershed composed of urban and agricultural land uses (NLCD) • Fertilizer application rates (FERT) • Presence and density of wastewater treatment facilities (NPDES), industrial facilities (TRI), superfund sites (SUPERFUND), and mines (MINES) • Cattle density (NA)[*] • Alteration to and spatial arrangement of riparian vegetation (LANDFIRE) • Chemical constituents of groundwater (NA)

Table 1
Continued.

Key function	Description	Major stressors	
		Within channel	**Outside channel**
Sediment regulation (SED)	Maintenance of the volume and size composition of inorganic particles that are stored or transported through the stream or within lakes, wetlands, or estuaries.	• Presence and volumes of reservoirs (NABD) • Stream channelization and levee construction (NA)	• Alteration to and spatial arrangement of riparian vegetation (LANDFIRE) • Presence and density of mines (MINES), forestry practice (LANDFIRE), and roads (TIGER) • Agriculture (NLCD) weighted by soil erodibility (CONUS-SOIL)
Hydrologic connectivity (CONN)	Presence of hydrologic pathways for the transfer of matter, energy, genes, and organisms within watersheds. Systems can vary naturally in their hydrologic isolation (e.g., desert springs) or connectedness (e.g., the Everglades).	• Presence and volumes of reservoirs (NABD) • Stream channelization and levee construction (NA) • Road/stream intersections (TIGER/NHD) weighted by stream reach slope (NHD)	• Alteration to and spatial arrangement of riparian vegetation (LANDFIRE) • Density of ditches/canals (NHD) • Groundwater use (NA)[*] • Presence and density of wastewater discharge sites (NPDES) • Percent of riparian zone composed of urban and agricultural land uses (NLCD)
Temperature regulation (TEMP)	Maintenance of the full range of natural landscape features (both aquatic and terrestrial) required to maintain temperatures that support the aquatic chemistry and biota.	• Presence and volumes of reservoirs (NABD)	• Alteration to and spatial arrangement of riparian vegetation (LANDFIRE) • Percent of watershed composed of agricultural land uses (NLCD) • Percent of watershed composed of urban land uses in the riparian zone (NLCD) • Groundwater use (NA)[*] • Presence and density of wastewater discharge sites (NPDES)

Table 1
Continued.

Key function	Description	Major stressors	
		Within channel	**Outside channel**
Habitat provision (HABT)	Presence and maintenance of the full range of natural landscape features (both aquatic and terrestrial) that represent the complete set of conditions that are needed to maintain the natural diversity and abundances of aquatic biota.	• Presence and volumes of reservoirs (NABD)	• Alteration to and spatial arrangement of riparian vegetation (LANDFIRE) • Density of housing unit developments within riparian zones (TIGER) • Percent of watershed composed of agricultural land uses (NLCD) • Density of road/stream intersections (TIGER/NHD) • Density of roads within riparian zones (TIGER)

[*]County data were available for groundwater use and cattle density but were not utilized because of quality control and data resolution issues.

KEY:

CONUS-SOIL – Penn State University soil characteristics dataset, based on STATSGO (http://www.soilinfo.psu.edu/index.cgi?soil_data&conus)

FERT – County-level estimates of N & P from commercial fertilizer (http://pubs.usgs.gov/sir/2012/5207)

LANDFIRE – USFS and USDOI LANDFIRE Program (http://www.landfire.gov)

MINES – USGS Mines Dataset (https://www.sciencebase.gov/catalog/folder/4f4e4767e4b07f02db47e0ad), USGS National Coal Resources Data System (NCRDS), and US Stratigraphy (USTRAT) data of coal mine sites (http://ncrdspublic.er.usgs.gov/ncrds_data)

NA – Not available

NAPD – National Atmospheric Deposition Program National Trends Network (http://nadp.sws.uiuc.edu/data/ntn)

NHD – National Hydrography Dataset (http://www.horizon-systems.com/NHDPlus/NHDPlusV2_home.php)

NABD – 2012 National Anthropogenic Barrier Dataset (https://www.sciencebase.gov/catalog/item/56a7f9dce4b0b28f1184dabd)

NLCD – National Land Cover Dataset (http://www.mrlc.gov/nlcd06_data.php)

NPDES – USEPA National Pollutant Discharge Elimination System (http://www.epa.gov/enviro/geo_data.html)

SUPERFUND – USEPA Superfund Sites (http://www.epa.gov/enviro/geo_data.html)

TIGER – US Census Bureau TIGER/Line Program (http://www2.census.gov/geo/pdfs/maps-data/data/tiger/tgrshp2013/TGRSHP2013_TechDoc.pdf)

TRI – National Toxic Release Inventory (http://www.epa.gov/enviro/geo_data.htm)

[All websites accessed April 26, 2016, except CONUS-SOIL accessed July 25, 2016.]